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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER				
EMPIE, NATHAN H				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/521,242

Applicant(s)

OGAWA, MIKI

Examiner

NATHAN H. EMPIE

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2009.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5 and 7-17 is/are pending in the application.
- 4a) Of the above claim(s) 7-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-845)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/15/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Examiner acknowledges receipt of 1/7/09 amendment to the claims which was entered into the file. Claims 1, 3, 5 and 17 are currently pending examination, claims 7-16 have been withdrawn.

Election/Restrictions

This application contains claims 7-16 drawn to an invention nonelected without traverse in the reply filed on 7/10/08. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144). See MPEP § 821.01.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stucky (WO 99/37705; hereafter Stucky) in view of Nogues et al (US patent 5,076,980; hereafter Nogues) and Miyata et al. ("Alignment of Mesoporous Silica on a Glass Substrate by a Rubbing Method" Chem. Mater. V11 (1999) 1609 – 1614; as provided in applicant's IDS dated 9/29/05; hereafter Miyata).

Claim 1, 3, 5, and 17: Stucky teaches a method for manufacturing a mesoscopically ordered, mesoporous structured films and monoliths (of metal oxides

such as SiO_2 , SnO_2 , etc) (abstract, pg 18 lines 20 – pg 19 line 30, pg 36 line 24 – pg 37 line7) comprising the steps of:

preparing a reactant solution that contains a metal precursor material for forming mesostructured films and monoliths which contain a metal oxide (see, for example, TEOS (pg 36 line24 – pg 37 line7), or metal chlorides (such as, SnCl_4 , listed in pg 65, Table 3)) and amphiphilic materials such as a non-ionic surfactant (see, for example, $\text{C}_{16}\text{H}_{33}(\text{OCH}_2\text{CH}_2)_{10}\text{OH}$ ($\text{C}_{16}\text{EO}_{10}$) (cetyl hydrophobic group) and numerous other non-ionic alkyl polyethylene oxide (polyoxyethylene-ether) surfactants (pg 38 lines 21 –30, pgs 63-64, Table 2) or amphiphilic poly(alkylene oxide) block copolymers (see, for example, PEO-PPO-PEO pg 18 lines 20 – pg 19 line 30));

applying the reaction solution onto a substrate by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line7), (pg 42 lines 8 – 23)).

Stucky teaches an aging time to allow the solution to gel, and drying of gel (see, for example, (pg 42 lines 8 – 23)). Stucky further teaches that in the processes of forming these mesoporous films and monoliths, synthetic conditions such as the humidity can be modified to impact the resulting structure of the film (pg 46 lines 5 – 13), thereby recognizing humidity as a result effective variable. Also Stucky mentions that modifications including additional heat treatments following gelation can produce harder materials that are less likely to crack, but Stucky is silent as to the specifics of such treatments (pg 39 lines 1 – 7), so Stucky does not explicitly teach forming the mesostructured film at a temperature of 100°C or less in a vapor-containing atmosphere at a relative humidity in a range of from 40% to 100%. Nogues teaches a two-part

drying step where the first-step of the process involves placing a gelled sol-gel (from a TEOS precursor) in an oven at a relatively low temperature (40-80°C), the heating further (from 40-100°C) at relative humidity typically between about 50-100% (col 5 lines 33 – 39, col 6 lines 7 – 21). This hydrated heat treatment is conducted to reduce the amount of drying-induced cracking that occurs during the drying of sol-gel precursors (col 1 lines 44 – 64, col 2 lines 25 – 37). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a preliminary heating-treatment step involving holding the sol gel in water vapor containing high humidity environment of between 50-100% RH, at 40-100°C as taught by Nogues, into the process of forming a sol-gel derived coating, as taught Stucky, as Stucky describes humidity as result effective variables for his process, as well as introducing additional heat treatments, but is silent as to specific conditions of each, and Nogues teaches the conditions of a high humidity treatment step that will lessen the occurrence of drying-induced cracking of a sol-gel.

Stucky in view of Nogues teaches all the features of these claims except for the limitations directed to the substrate having a capability of / and orienting an aggregate of the amphiphilic material in a predetermined direction. Stucky further teaches that the reaction solution can be applied onto a substrate (such as glass) by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line 7), (pg 42 lines 8 – 23)). Miyata teaches a method of preparing a film of mesoporous material (silica, from a TEOS / surfactant reactant solution) on a coated glass substrate (see, for example, pg 1609-1610, Abstract, and "Experimental Section"). The glass substrate is

provided with a polyimide film that is treated with rubbing which gives alignment control to the substrate, which is taught as desirable in that it provides an ordered mesoporous films with aligned channels (see, for example, pg 1610, first col, and "Experimental Section"). The result of the film formation process is an aligned structured with oriented channels aligned with respect to the substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated using a glass substrate provided with a precoating of a rubbed polymer film, as taught by Miyata, as the glass substrate taught in the method of Stucky in view of Nogues as it would provide a desirable ordered alignment of the for the mesostructured / mesoporous coating. Such an incorporation would result in a method which would possess a substrate having a capability of orienting aggregate of the amphiphilic material, and one wherein aggregates of the amphiphilic material would be oriented in the predetermined (rubbing) direction.

Claim 17: Stucky further teaches removing the amphiphilic material to form a pore (see, for example, calcination step, pg 42 lines 19 - 23).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 3, 5 and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4, and 7 of copending Application No. 11/267156 (hereafter '156) in view of Miyata.

Claims 1, 3, 5 and 17: '156 teaches a method of producing a mesostructured film comprising a reaction solution containing a precursor material (such as tin chloride) for a mesostructured film which contains a tin oxide, and an amphiphilic material (surfactant) (claims 1, 2, 4). '156 further teaches the step involving holding the substrate in a vapor containing atmosphere is performed at a temperature of 100°C or less at a relative humidity in a range of from 40% to 100% (claims 3 and 7)

'156 teaches all the features of these claims except for the limitations directed to the substrate having a capability of / and orienting an aggregate of the surfactant material in a predetermined direction, and an actual recitation of removing the surfactant material to form a pore. These remaining limitations are taught by Miyata. Miyata teaches a method of preparing a film of mesoporous material (silica, from a TEOS / surfactant reactant solution) on a coated glass substrate (see, for example, pg 1609-1610, Abstract, and "Experimental Section"). The glass substrate is provided with a polyimide film that is treated with rubbing which gives alignment control to the substrate,

which is taught as desirable in that it provides an ordered mesoporous films with aligned channels (see, pg 1610, first col, and "Experimental Section"). The result of the film formation process is an aligned structured with oriented channels aligned with respect to the substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated using a substrate provided with a precoat of a rubbed polymer film, as taught by Miyata, as the substrate in '156 as it would provide a desirable ordered alignment of the for the mesostructured / mesoporous coating. Although '156 has not explicitly taught removing the surfactant material to form a pore, it has taught forming a mesoporous material which is formed with an surfactant material (claim 1), and Miyata has further taught the removal of surfactant forms pores (see, for example, experimental section).

This is a provisional obviousness-type double patenting rejection.

As relied upon for above rejections, the examiner is putting Ogawa et al PGPub 2006/00057296 on record as it is the publication of application 11/267156.

Response to Arguments

Applicant's arguments filed 1/7/09 have been fully considered but they are not persuasive.

The applicant has argued that Stucky teaches a method of mesophase synthesis using surfactants for self assembly, while Nogues teaches a method which does not involve surfactants; and because of this Stucky is "teaching away", and there would be no motivation to combine the references. The examiner disagrees that just because the method of Stucky teaches the use of surfactants in the sol-gel synthesis process that

Stucky is teaching away from the method of Nogues. Both Stucky and Nogues are drawn to methods to produce stable sol gel structures, wherein Nogues has explicitly taught a way to reduce cracking via heat treatment in alignment with the broad teaching of Stucky. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Stucky teaches an aging time to allow the solution to gel, and drying of gel (see, for example, (pg 42 lines 8 – 23)), but does not explicitly teach holding the gel in an atmosphere containing water vapor to form crystals of a metal oxide in pore walls of the porous film. Stucky does however teach that in the processes of forming these mesoporous films and monoliths, synthetic conditions such as the humidity can be modified to impact the resulting structure of the film (pg 46 lines 5 – 13), thereby recognizing humidity as a result effective variable. Also Stucky mentions that modifications including additional heat treatments following gelation can produce harder materials that are less likely to crack, but Stucky is silent as to the specifics of such treatments (pg 39 lines 1 – 7). Nogues teaches the conditions of a hydrated heat treatment which result in a reduction in the amount of drying-induced cracking that occurs during the drying of sol-gel precursors (col 1 lines 44 – 64, col 2 lines 25 – 37). Therefore it would have been

obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a preliminary heating-treatment step involving holding the sol gel in a high humidity water vapor environment of between 50-100% RH, at 40-100°C as taught by Nogues, into the process of forming a sol-gel derived coating, as taught Stucky, as Stucky describes humidity as a result effective variable for his process, as well as introducing additional heat treatments, but is silent as to specific conditions of each, and Nogues teaches the conditions of a high humidity treatment step that will lessen the occurrence of drying-induced cracking of a sol-gel.

Second, the applicant argues (pages 7-8) that neither Stucky nor Nogues individually have taught the formation of metal oxide crystals on the pore walls, nor that the artisan would not expect nor understand from Nogues that metal oxide crystals would form on the walls. The examiner reminds the applicant that the rejection of claims 1,3,5, and 17 are over Stucky in view of Nogues and Miyata, and, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The applicant argues that individually Nogues does not teach metal oxide crystals forming on pore walls (pg 4). The examiner agrees that individually Nogues does not explicitly teach metal oxide crystals forming on pore walls following the high humidity treatment, but when incorporating such a step into the method of Stucky, such metal oxide crystals would inherently form as the combination of Stucky in view of Nogues teaches a coating chemistry and conditions substantially identical to those of the claimed invention

which are needed to form the metal crystals (from preparation of the reactant solution containing a metal compound and a surfactant through to holding the substrate in an atmosphere containing water vapor, as described in the rejection above). Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of obviousness has been established, *In re Best*, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not" *In re Spada*, 15 USPQ2d 1655 1658 (Fed Cir. 1990). Further In response to applicant's argument that "Nogues utilizes high humidity for the drying step and not for forming crystals of an oxide", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Third, the applicant argues (page 8) that Miyata individually has not taught forming a mesostructured film containing tin oxide formed from a tin compound. The examiner reminds the applicant that the rejection of claims 1,3,5, and 17 are over Stucky in view of Nogues and Miyata, and, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner asserts that the primary reference, Stucky, has taught forming a mesostructured film containing tin oxide

formed from a tin compound (or from other oxide precursors including silicon alkoxides), and further teaches that the reaction solution can be applied onto a substrate (such as a glass substrate) by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line7), (pg 42 lines 8 – 23)). Miyata is solely relied upon for the teaching of providing a glass substrate with a polyimide film that is treated with rubbing which gives alignment control to the substrate, which is taught as desirable in that it provides an ordered mesoporous films with aligned channels (see, for example, pg 1610, first col, and "Experimental Section"). The result of the film formation process is an aligned structured with oriented channels aligned with respect to the substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated using a glass substrate provided with a precoat of a rubbed polymer film, as taught by Miyata, as the glass substrate taught in the method of Stucky in view of Nogues as it would provide a desirable ordered alignment of the for the mesostructured / mesoporous coating. Such an incorporation would result in a method which would possess a substrate having a capability of orienting aggregate of the surfactant material, and one wherein aggregates of the surfactant material would be oriented in the predetermined (rubbing) direction.

Fourth, applicant's arguments, directed toward the provisionally rejected, nonstatutory obviousness-type double patenting rejection have been fully considered but they are not persuasive. The applicant argues that: "the instant '242 Application requires the presence of the 'a substrate having a capability of orienting an aggregate of the surfactant in a predetermined direction'. The claims of the '156 application include

no such recitation". In response the examiner asserts that the nonstatutory obviousness-type double patenting rejection over claims 1,3,5, and 17 were made over claims 1-4 and 7 of copending Application No. 11/267156 in view of Miyata. The examiner has explicitly stated in the previous and current rejection that the current limitation being argued was taught Miyata. Therefore the nonstatutory obviousness-type double patenting rejections are maintained. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 7:00- 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. H. E./
Examiner, Art Unit 1792

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792